Hands on Systematic Innovation
Problem Solving Tools - Measurement Problems

Presentation in the Module 10-202-2312

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Measuring for Mechanics

- ▶ Dimensions needed for functionality
- ▶ Need to confim all given dimensions
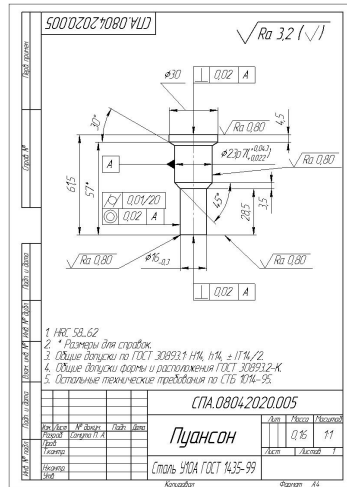- ▶ Know exactly how to measure them
- ▶ No unnecessary measuring

Figure: Technical drawing by Pavelsamuta1

Measuring Code Quality

- Why?
    - Readability
    - Maintainability
    - Reusability
- What?
    - Complexity
    - Number of defects
    - Standards
- How?
    - Count lines of code
    - Cyclomatic Complexity
    - Defect Density
    - Count comment lines

Measurement in Business Context

- ▶ Financial success
- ▶ Customer satisfaction
- ▶ Production costs
- ▶ Brand value
- ▶ Product Quality

Measuring

- ▶ What to Measure and Why to Measure It?
- ▶ How to Measure?
- ▶ Case Studies

Measuring popular amongst Manager

- ▶ 'you don't fatten a cow by weighing it'
- ▶ 'what gets measured gets done'
- ▶ 'the most important numbers are unknown and unknowable'

Ideality Equation

Used throughout the systematic innovation methodology.
Here for the individual elements or the whole system.

$$\text{Ideality} = \text{Perceived}\left(\frac{\text{Benefits}}{\text{Cost} + \text{Harm}}\right)$$

Costs Most popular element and easy to measure.

Harm Waste, environmental- and sustainability issues.

Benefits Value of product/service from perspective of receiver.

Perceived Respects complexity and uncertainty of intangibles.
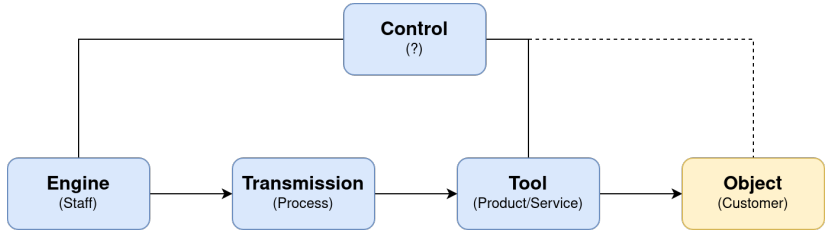
Need for overall Ideality

Figure: Feedback and Control in a viable System (adapted from D. Mann "Hands on Systematic Innovation for Business and Management", p. 354)
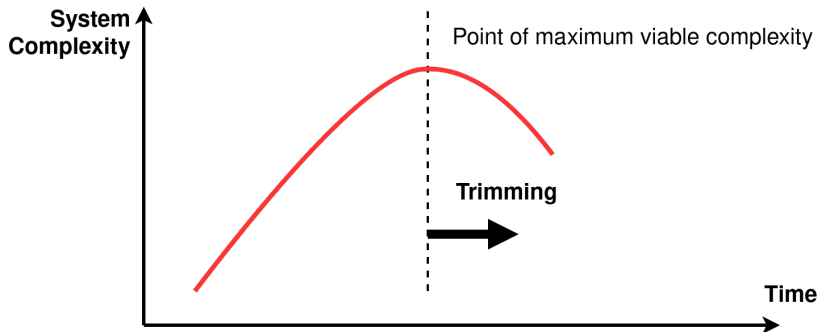
Complexity

Figure: Complexity Trend (adapted from D. Mann "Hands on Systematic Innovation for Business and Management", p. 355)

Seminarconcept - Triz Methodology

- ▶ to sharpen intended effects in functional modelling as an Ideal Final Result or Ideal Machine,
- ▶ to identify negative (harmful) effects occurring during implementation,
- ▶ to localise such problems as contradictory behaviour in a delimitable "operational zone",
- ▶ and finally to resolve such contradictions by transforming a "system as it is" into a "system as required".

(A) Modify the system so that there is no need to make the detection or measurement

- ▶ Eliminate the need for measurement
- ▶ Use already existing resources
- ▶ Increase company transparency
- ▶ Integrate measures into one another
- ▶ Be careful!

(B) Make the detection or measurement on a copy, image or replica of the object or system

- ▶ Beta test networks as seperate microcosm
- ▶ Test audiences
- ▶ Customer feedback through internet-based forms
- ▶ Virtual customers?

(C) Transform the problem into one involving successive measurement of changes

▶ Measure delta's between successive measurements
▶ Key/Mouse-click rate to detect competence of user
▶ Response times in a car to measure intoxication
▶ Predict frequency of future measurements
▶ Identify proximity to potential non-linearities by changing frequency

(D) Add a new element (communication or person or element) to provide an easily detectable parameter related to the parameter required to be measured or detected

- ▶ Mystery Shopper, e.g. on customer service
- ▶ Suggestions schemes
- ▶ Notice boards
- ▶ Cookies
- ▶ Interactive TV
- ▶ GPS tracking system

(E) If it is not possible to modify the system, then introduce an easily detected element to the surrounding environment

- ▶ Bring in a temporary consultant
- ▶ CCTV cameras
- ▶ Heisenberg Uncertainty Principles

(F) If it is not possible to introduce an easily detectable element into the environment surrounding a system, obtain the desired measurement by detecting changes in something already in the environment

- ▶ Use friends and family to obtain information on morale
- ▶ Use press to measure changes in customer market suggestion
- ▶ Key-presses on a computer keyboard
- ▶ Audience noise levels

(G) Make use of psychological effects to help make the measurement

- ▶ Telling someone they can't have something is a good way of making them want it: Feedback mechanism
- ▶ Most people have the desire to be helpful
- ▶ People need certain amount of stimulus before they commit
- ▶ Be inclusive when formulating questions
- ▶ Bad news travels faster than good news
- ▶ The more you tell people the more they think you're hiding

(H) Use emotional effects to help to make the measurement

- ▶ Identification and use of exciters
- ▶ Identification and use of customer hot buttons
- ▶ Emphatic listening

(I) Use the inverse or opposite system to make the measurement

▶ Measure empty space, things that aren't present
▶ Measure non-customers

Measuring Business Performance

> **What to measure?**
> Business often measure success based on what is measurable rather than what is important.

- Photographic paper industry
- Regular measurements: streams of incoming and outgoing resources
- What is the main useful function?
- Use knowledge about how customers use product to improve, and know what to measure

Project Management System Measurements

> **Relationship measurement and resources**
>
> The ideal final result project management measurement requires no additional resource to acquire it.

- ▶ Global statistics show that 85% of project end late, over-budget or under-specification
- ▶ Common-sense approach: If there isn't enough data to be successful, hire more project managers
- ▶ Measurement should become self-sustaining without further resources

Measuring best practice

▶ Measurement methods most needed when system is in evolutionary development and is suffering from inadequate feedback and control mechanisms.

▶ When a new function is added to the system

▶ Define in simple functional terms the measurement required from the system under consideration.

▶ Is the measurement actually required by thinking about the useful function it is intended to deliver?